ABSTRACT OF THE DISCLOSURE

A method of removing metallic mercury and ionic mercury from flue gases, especially of a power plant, is provided. A gas that contains sulfur dioxide, or other adequate amounts of sulfur in the form of H_2S or COS, and a gas that contains hydrogen, are conveyed to a catalyzer for producing a gas that contains elemental sulfur and hydrogen sulfide. This gas is conveyed to flue gas upstream of a separator, wherein mercury in the flue gas reacts with the sulfur and ionic sulfur in the gas and is separated out in the separator.